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PLANKING

MODEL SHIPS

by Richard Mansir

A STEP BY STEP PROCEDURE FOR BEGINNING AND ADVANCED MODELERS

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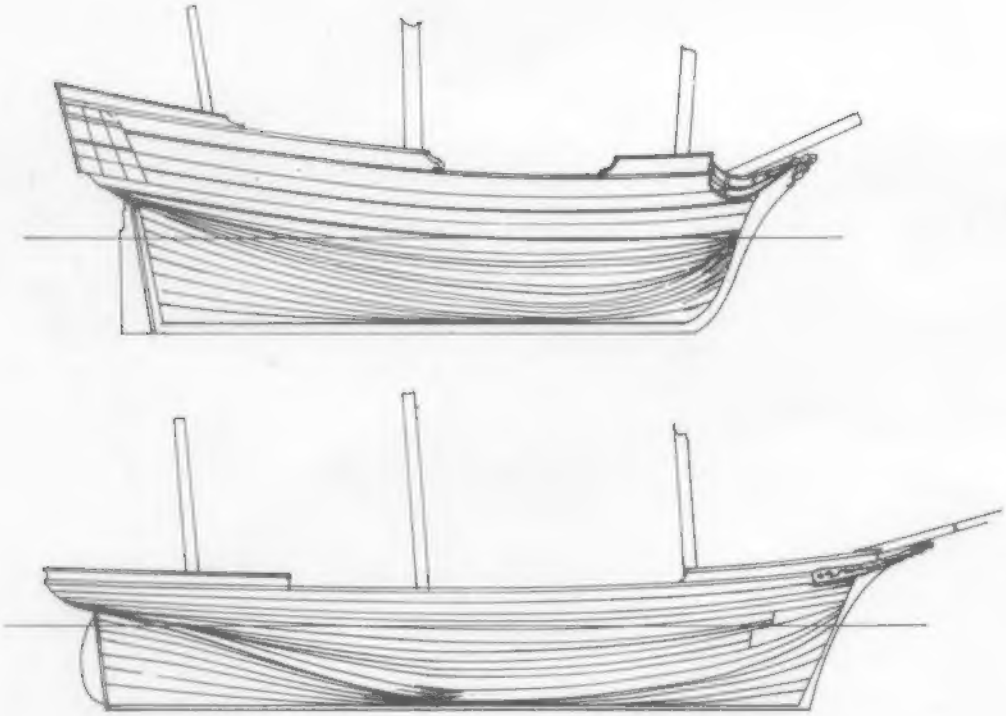

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ON THE COVER: A fine plank-on-frame model of the brig *Leon* by Joe Seela

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PLANKING MODEL SHIPS

by

A. Richard Mansir

INTRODUCTION

The time has come to plank your ship model hull. You have the bulkheads correctly set up on the keel and faired down so that the planks will lie flat against them. And there on your bench is all that beautiful hardwood just waiting for assembly into the fine curves of your ship. Where do you go from there?

You have a choice dictated by the amount of detail you wish to build into your model. Clearly the more detailed the model, the more work it represents.

Some experienced modelers are so passionately committed to impeccable precision, they make parts that cannot be seen by the human eye. Other diehards model every timber in a real ship's framing—many hundreds of finely finished pieces—only to cover up all this work with planking, hiding it from view forever. The satisfaction, for them, comes from having done it, rather than having their workmanship seen.

The majority of modelers, however, consider detail beyond the threshold of human perception as not worth the effort. They build models to be seen and appreciated as works of art, and not to prove that it is possible to engrave the *Declaration of Independence* on the head of a pin.

This booklet describes two approaches to the job of planking. One is more simple and less detailed; the other is more complex in that it conforms with actual full scale shipbuilding practice. It is up to you to decide how far you want to go between the extremes.

As a first step in deciding the approach you wish to take in the planking of your ship, read through this booklet and familiarize yourself with real shipbuilding practice. It will help you understand what occurs as planks are made to conform with the many subtle curves of the hull.

Often the beginning modeler misses this point and proceeds with his planking as if he were siding a house. Then, after laying a half dozen or so planks, the painful truth comes clear. It becomes necessary to force planks into strange if not impossible bends. The shape of the unplanked areas look very irregular and certainly cannot be filled with stock of even, regular dimensions. And the whole job suddenly is a vast "puzzlement."

The "puzzlement" disappears, however, when it is realized that planks taper fore and aft because the areas to be covered at the bow and stern are less than those at midships. One must have more material in the middle than at the ends, and this simple premise could easily be all the explanation you need to work out a completely satisfactory planking job. But the more detail you understand, the easier it will be to make sound creative judgments, leading to a superior piece of work.

At first sight some may think that planking a ship model is a dreadfully complicated task. It is not. Like all so-called "complicated" tasks, a successful planking job consists only of a number of very simple tasks performed one at a time. Thoughtful reading of what follows here, we think, will satisfy you of the truth of this proposition.

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PREPARATIONS

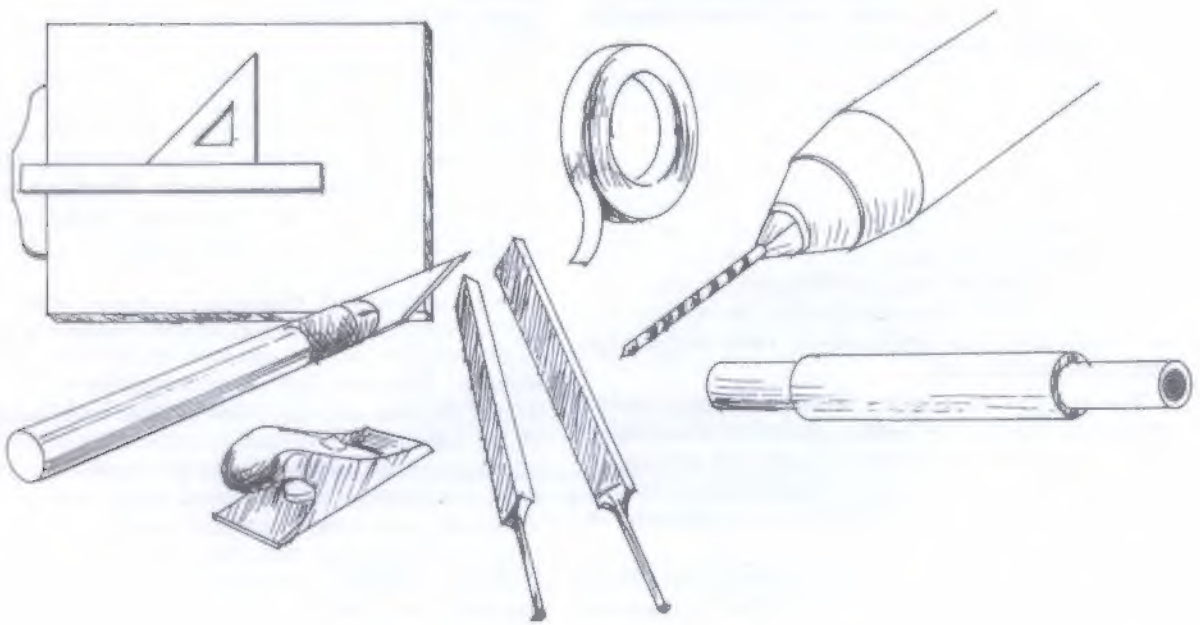
Prior to planking your ship, of course, you will have completed the frame assembly. The checklist for the properly assembled frame will include the following items:

1) Perfect alignment of the bulkhead frames as viewed from both the top, side, and ends.
2) The edges of the bulkhead frames bevelled so that the planks will lie squarely against them.
3) Firm blocks carved to shape at the bow and stern to serve as a firm footing for the planks.
4) Grooves cut into the keel, stem, and sternpost to allow for good clean joints between them and the planks that fit them.
5) Marks on the edge of the bulkheads indicating the position of the first layer of planks. On older ships this will be the position of an extra heavy layer of planks called the wale. Some ships had two or three wales in which case the lowest one should be the first installed. On newer ships, the first plank is the one that meets the edge of the deck, called the "sheer plank."

If all is correct, relax, clear the bench of all but the plank material and the handful of tools you need, and settle in for the pleasant, absorbing task ahead.

TOOLS

1) T-square, triangle, and a small drawing board on which you can draw a series of parallel lines at least a foot long. (optional)
2) Low tack drafting or white artists tape ± ¼" wide.
3) X-acto knife or equal.
4) Flat faced mill file, or small plane, or small belt sander.
5) Drill of a diameter equal to about 1" to 1½" in the scale of the model. (optional)
6) Household ammonia in a stoppered plastic tube about half as long as the model overall.
7) Elmer's carpenter's wood glue or equal. Use a glue that can be sanded.
8) Sandpaper—coarse and fine to #400 grit.

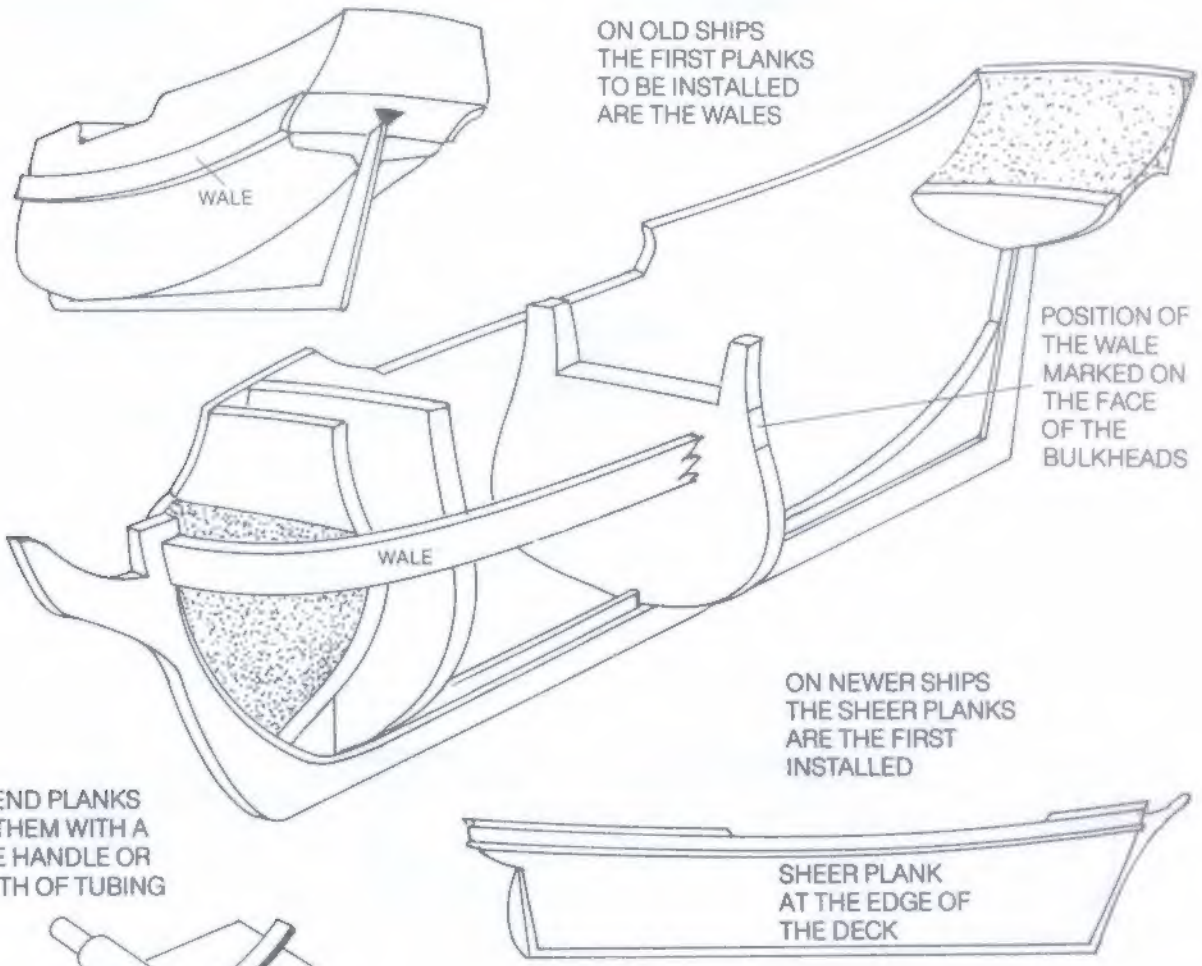


PART I—SIMPLE PLANKING

Simple planking will yield a beautiful hull which might be painted or finished in natural wood where the scale detail of the various seams and butts of the planks are ignored in favor of a smooth skin of wood. The flow of the ship's planking is suggested by the grain of the wood and the slight color variations of the various planks. The overall effect is comparable to that of a piece of fine inlaid furniture.

1) Begin the installation of the sheer plank or wale by cutting the end of a plank so that it makes a neat, clean joint in the groove of the stem, then test to see if the plank can be sprung into position against the bulkheads. If you find the curves are too severe for easy positioning, place the plank on a flat surface and rub it with your knife handle. The rubbing will cause the plank to curl sufficiently to satisfy all but the most extreme bends in the hull.

To get the planks to conform with these very severe bends, you may have to resort to "wet" bending. Wet bending may be accomplished by holding the plank in the spout of a boiling teakettle; soaking it in hot water or in household ammonia. Any one of these "wet" treatments will soften the wood fibers and make it possible to almost tie knots with the planks. If you must use wet bending, however, work in the bends over a form or a pattern of nails and let the planks dry completely before installing them on the model, because the planks will expand while wet and shrink again upon drying. If you use steel pins or nails to make a form for such bending insulate the wet planks from them with plastic wire insu-

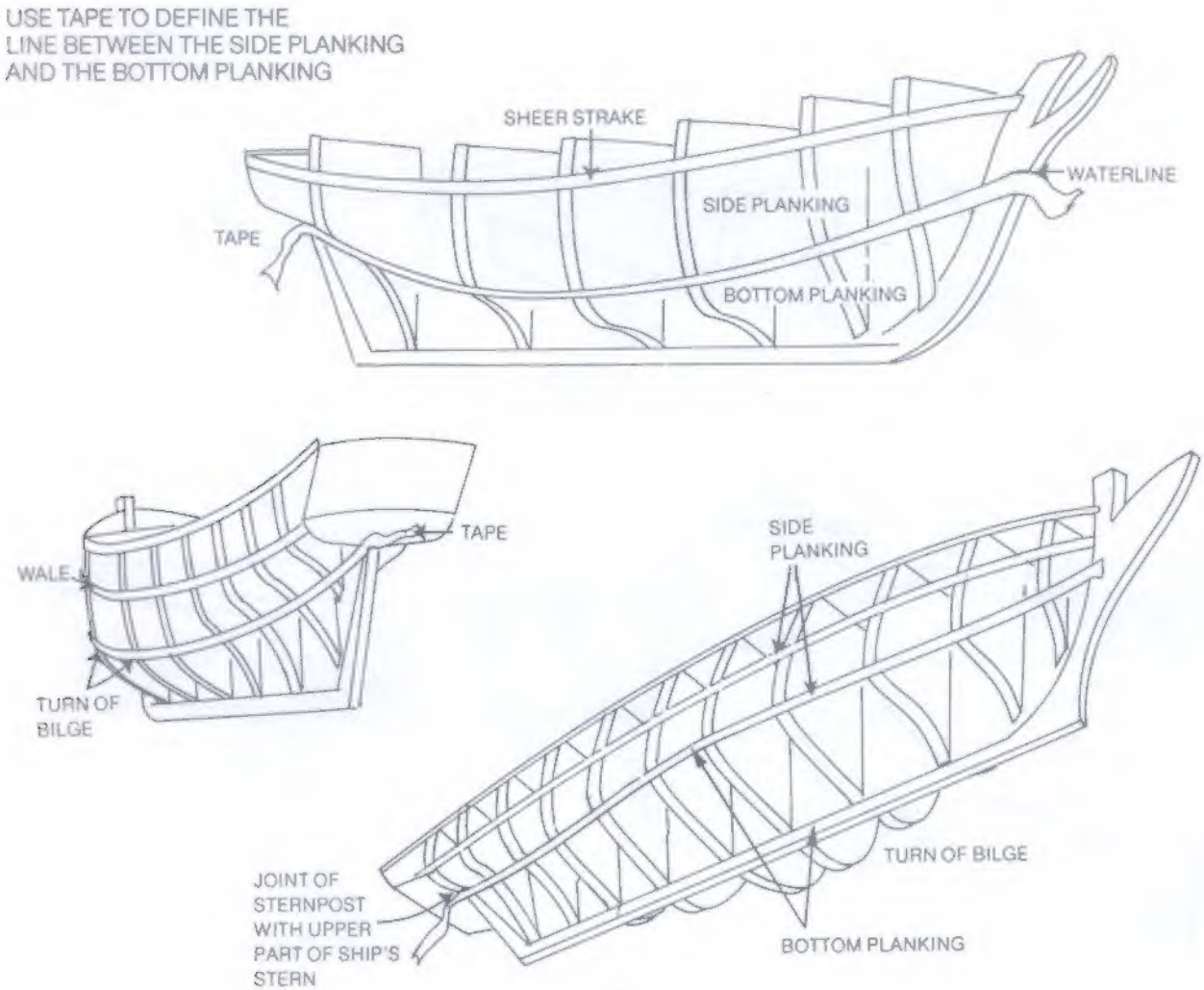


lation. Otherwise you stand a chance of the wood being spoiled by rust stains.

2) Divide each half of the hull into upper and lower portions. The upper portion will consist of the side planking; the lower one, the bottom planking. The line dividing the side and bottom planks will run from the bow at a point around the waterline down under the hull at the middle just where the change from bottom to side is most acute. The shipwrights call this area "the turn of the bilge." From there the line will run upward again toward the stern where it will end at the point where the sternpost meets the upper hull. As you proceed with your planking, you will be filling each of these two portions (side and bottom) as if they were separate tasks all together. The side planking will proceed from the sheer plank or wale downward; the bottom planking from the keel upward.

3) As you view your model in profile having marked out the division between the side and bottom, you will see that the upper area is shaped like a quarter moon. It will be clear that to fill the area entirely with planks, you will have either to taper all of the planks as they converge toward the bow, add extra widths of planks midships tapered on both ends, or a combination of both these expedients. The last will probably prove most satisfactory. So taper the ends of a half dozen or so planks over a length equal to about a third of the length of the model to a width at the end of about a third the width of the stock. Use a small plane or a mill file as shown in the illustration. Fit the tapered ends of the planks to the stem as you did with the sheer plank, working in the bends as required. As you lay each plank glue it to the one above along its edge as well as to the bulkheads. Try to join the plank edges so that they meet squarely with one another, bevelling them particularly where the curves of the ship are most acute.

Use glue such as Elmer's Carpenter's Wood Glue which sets fairly quickly and may be sanded when dry. With such material the planks may be installed



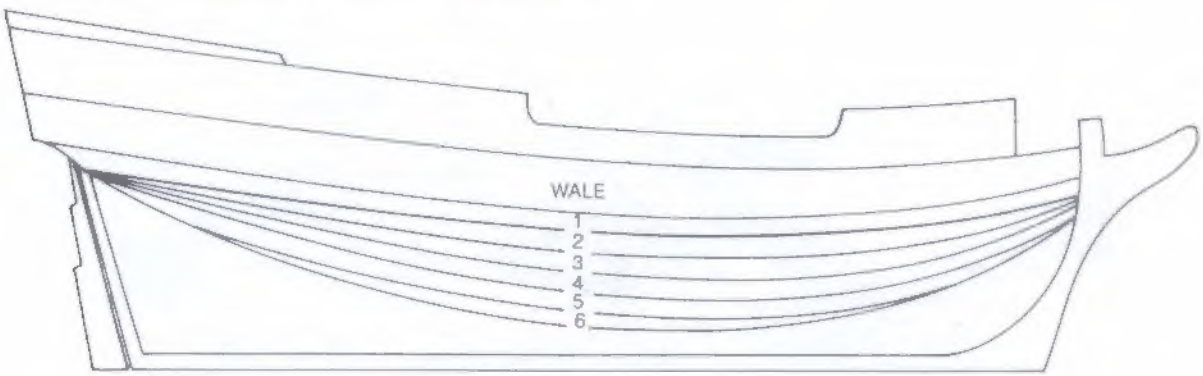
with no other clamps but your fingers to hold them until the glue sets. Alternately, you may secure the planks for drying with bent pins or tacks driven into the bulkheads. Try not to penetrate the planks themselves lest they be split or defaced with unsightly holes.

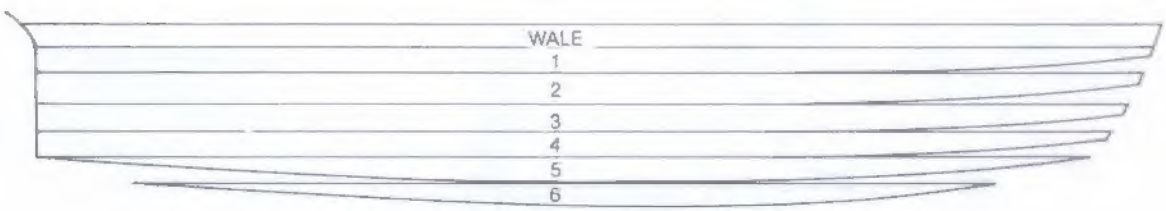
Install planks on both sides of the ship alternately checking for symmetry as you go.

4) As you reach the level in your planking where no more planks will fit on the stem within the side planking area, the rest of the side planks will be tapered to points toward the bow. Depending on the ship, tapers may also be required at the stern. These double tapered planks become shorter and shorter as they approach the limits of the side plank area.

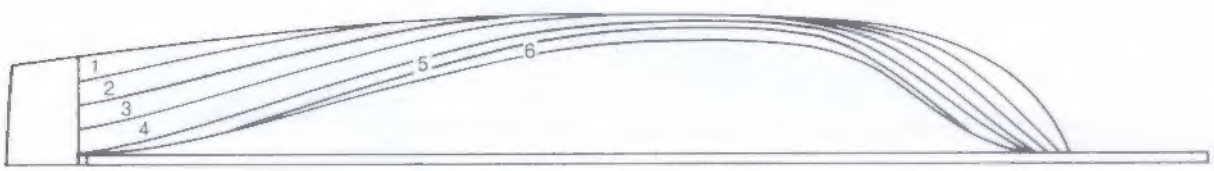
5) As you view your model from the bottom with the side planks in place, the shape of the area remaining to be planked on each side will look something like Robin Hood's bow curving from the middle toward the ends where reverse curves fair into the keel. The key characteristic of the bottom planks is that they twist through their lengths from vertical at the stem and sternpost to nearly flat at midships. This characteristic, in turn, brings about a second, in that as a pair of planks twist they naturally tend to fan out from each other.

THE SIDE PLANKS AS VIEWED BROADSIDE
THE NUMBER OF PLANKS VARY WITH DIFFERENT SHIPS





A SET OF SIDE PLANKS LOOK SIMILAR TO THIS IF REMOVED FROM THE HULL AND LAID FLAT. NOTE THAT PLANKS 5 AND 6 TAPER TO POINTS ON BOTH ENDS. YOUR MODEL COULD REQUIRE MORE THAN 2 PLANKS SO TAPERED.



SIDE PLANKS AS VIEWED FROM THE BOTTOM

6) In laying the first bottom plank next to the keel, shape it so that it tapers from widest at sternpost and bow, and narrower amidships as a first step to compensating for the fan effect. Then as subsequent planks are laid allow them to fan out on the sternpost. The same effect may also occur at the bow, but as the area to be covered here is smaller than at the stern, you may ignore the fan shapes and fit the planks conventionally.

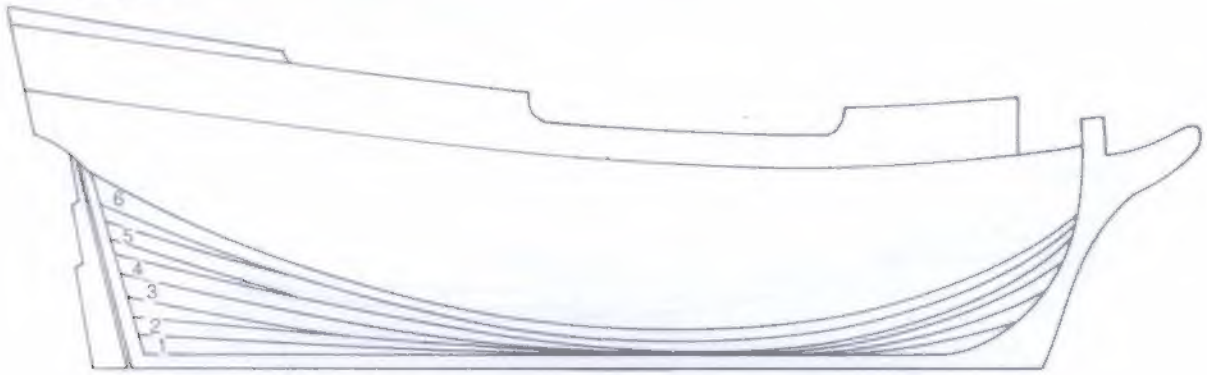
   Triangular shaped filler planks are made to fit the holes left by the fanned out full planks at the sternpost.

7) Double tapered planks may be required to complete the planking at midships similar to that of the side planking.

8) With all the planks in place sandpaper the hull removing excess dried glue and sharp corners. During the sanding process, if the edges of the planks have not been joined perfectly, unsightly gaps may show up in the seams. To fill these gaps, glue in slivers of planking material, sand them flush, and the defects will all but disappear.

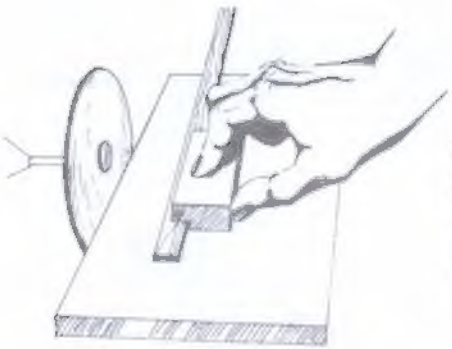
9) Finish the hull with paint or wood finish as you would a piece of furniture bearing in mind that a matte or satin finish is to be preferred to a high gloss. The model is now planked and ready for the construction of the decks and upper works.

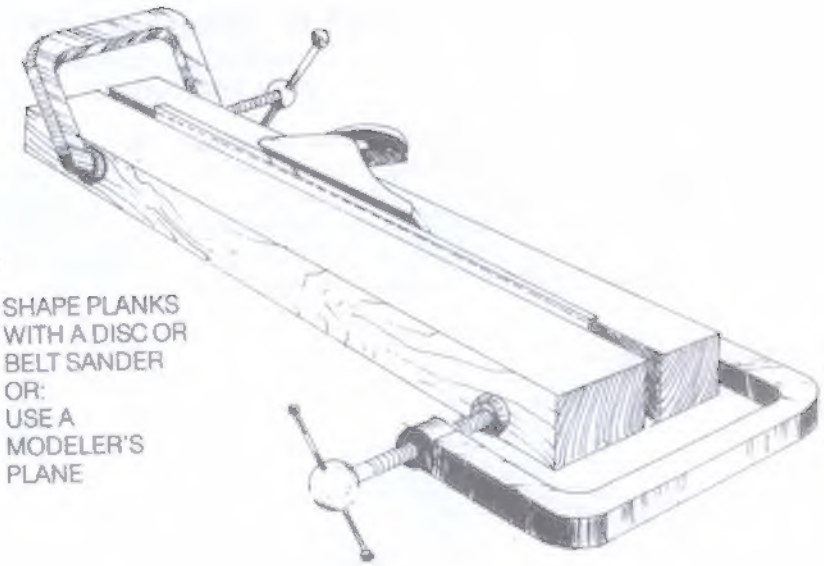
BOTTOM PLANKS AS VIEWED FROM THE SIDE
THE NUMBER OF PLANKS VARY WITH
DIFFERENT SHIPS



A SET OF BOTTOM PLANKS LOOK SIMILAR TO THIS IF REMOVED AND LAID FLAT. NOTE THE TRIANGULAR FILLERS NEAR THE STERN AND THE REVERSE TAPER OF PLANK 1.

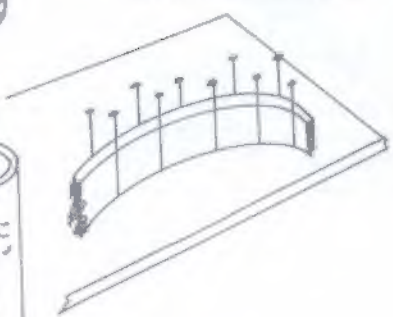
BOTTOM PLANKS AS VIEWED FROM THE BOTTOM

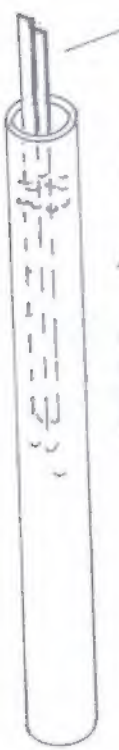




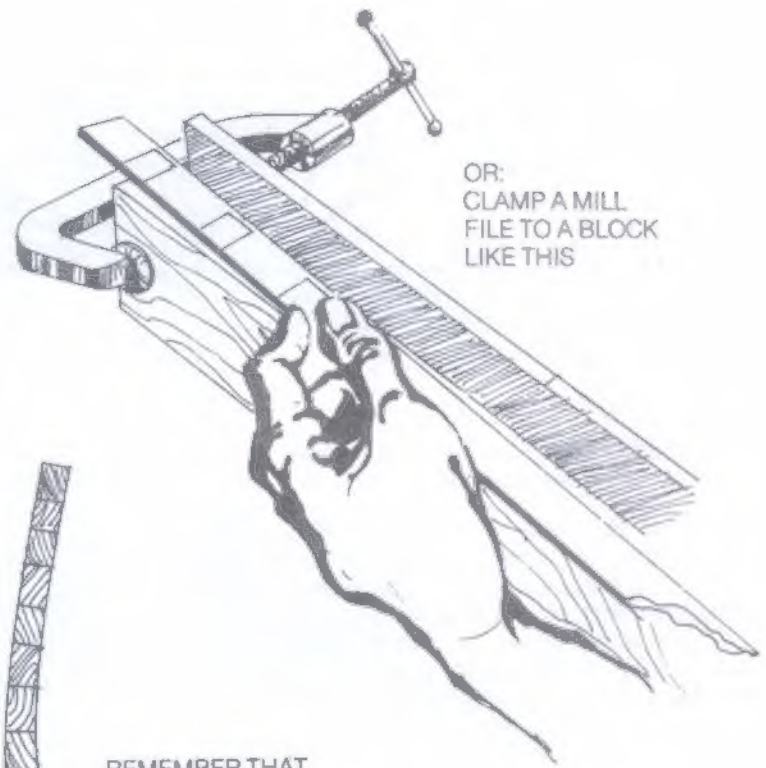
SHAPE PLANKS
WITH A DISC OR
BELT SANDER
OR:
USE A
MODELER'S
PLANE

INSULATE PINS
WITH PLASTIC
WIRE INSULATION

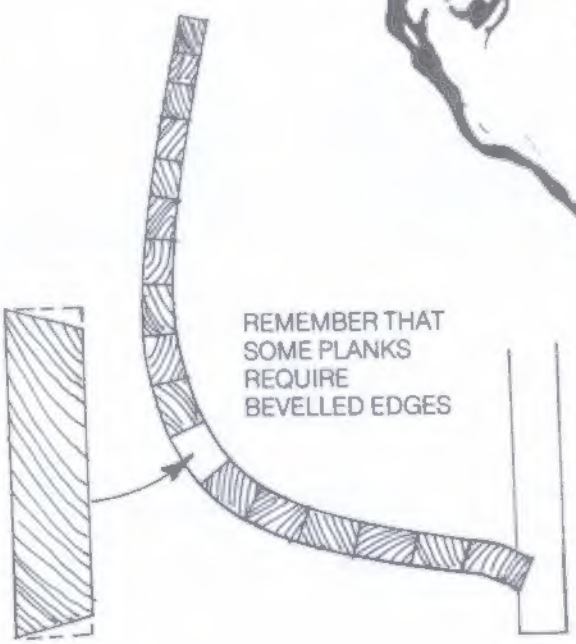




WET BEND PLANKS
WITH AMMONIA.
DO NOT INSTALL
UNTIL DRY



OR:
CLAMP A MILL
FILE TO A BLOCK
LIKE THIS



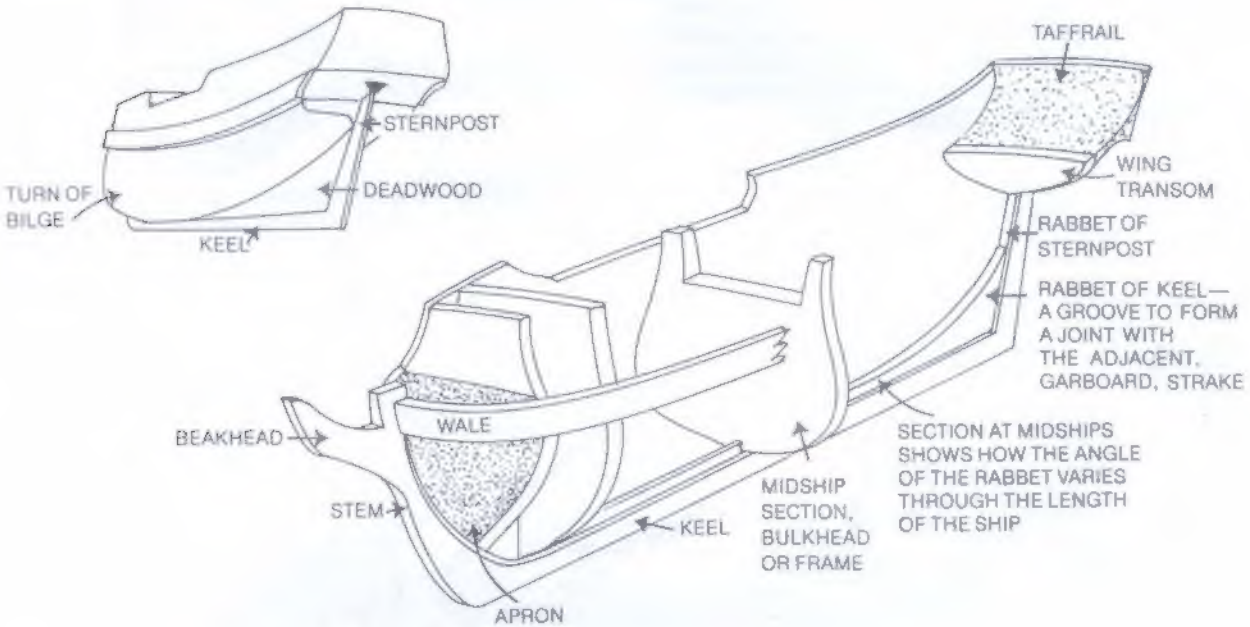
REMEMBER THAT
SOME PLANKS
REQUIRE
BEVELLED EDGES

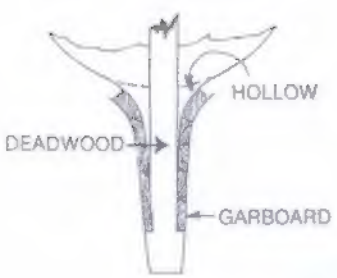
PART II—SCALE PLANKING

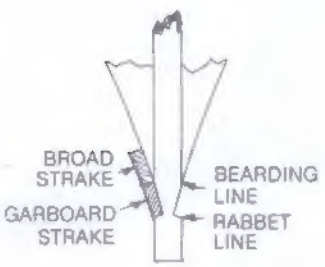
(NOT RECOMMENDED FOR SMALL SCALE MODELS LESS THAN 3/16" = 1'-0".)

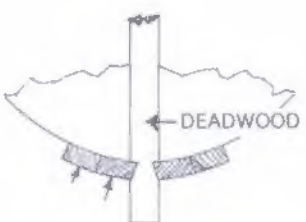
The pages that follow outline a procedure for simulating the planking patterns of full scale ships. The procedure is somewhat more technical and extended than that for simple planking, but not so difficult that the beginner should be disuaded from attempting it. A model whose planking matches that of the real thing is just that much more detailed and authentic looking as a finished work, and that much more an object of pride for the builder.

Before reading on, study the illustrations on this page to familiarize yourself with the technical terms you need to make sense of what follows.



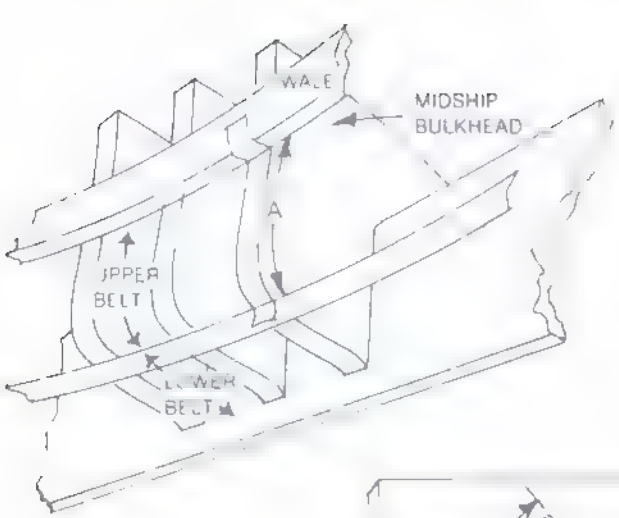


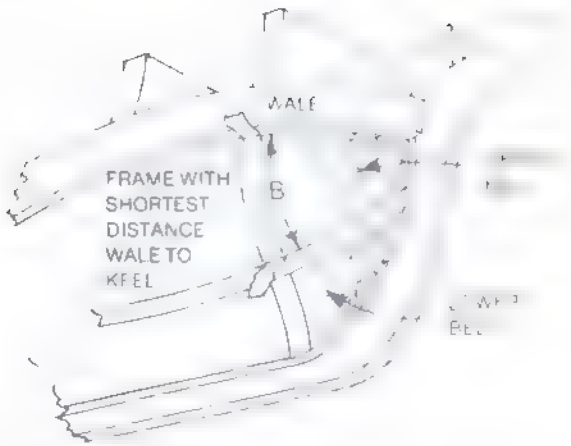


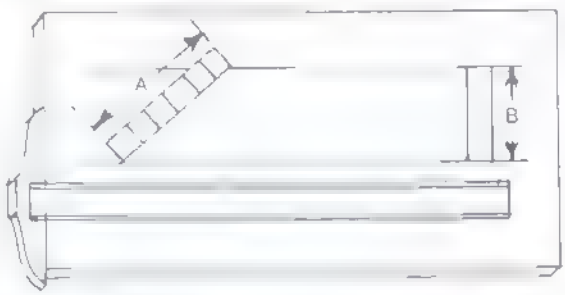


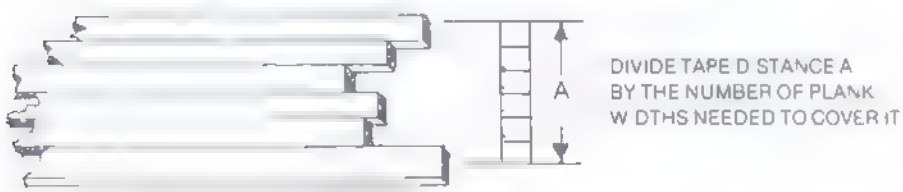
SECTION AT STERN SHOWING PLANKS OVER THE DEADWOOD

SPILING









The simulation of a real ship's planking requires that the shape and position of each plank on the hull be planned in advance of the actual laying of wood. The planning process is similar to full scale practice for which the shipwright's term is "spiling." Thus to "spile" a plank is to plot its taper, bevels, lengths and so on so that it precisely fits its assigned position on the hull.

1) We begin by subdividing each half of the hull into an upper and lower belt, each belt consisting of a certain number of strakes or rows of planks, and each belt will be planned out and installed as separate operations. This step is the same as that encountered with simple planking except that here we rephrase it in shipwright's jargon.

   The line of division between the upper and lower belts will run from the joint of the wing transom with the sternpost down under the turn of the bilge amidships and up again to the bow somewhere near the waterline. Use a strip of tape to identify this line over the face of the bulkheads. By eye, adjust the tape so that it runs in a fair curve from stem to stern whether viewed broadside or from the bottom. When one side is perfect, duplicate it on the other. Mark these lines on the bulkheads permanently with an indelible marker or knife slot so that they may never be lost. They are important.

2) Place a length of tape on the face of the midship bulkhead and cut it precisely to fit the distance between the under side of the wale and the line of division between the belts. Remove the tape and place it flat on the drawing board. Determine the number of widths of planking stock that are required to cover the tape allowing at least ½ plank width extra. This number will be the number of strakes in the upper planking belt. Mark the tape into a similar number of equal parts.

3) Repeat the procedure for the lower belt measuring a length of tape that extends from the rabbet of the keel up to the line of division. You now know the number of strakes that will occur in the lower belt. Mark this tape accordingly.

4) Place a tape on the bulkhead that represents the shortest linear distance between the keel and the wale. Normally this will be a bulkhead near the bow. But be sure the bulkhead is one that runs the whole distance from the keel, and not one that terminates higher up on the stem. Cut this tape also to match

the upper and lower belts.

5) With the T-square draw a horizontal line and place one of the tapes from step 4 vertical to it so that you can draw a second line parallel to the first at a distance equal to the length of the short tape.

6) Place the marked off midship tape diagonally between the two lines so that its length exactly fits.

7) Tape the faces of the rest of the bulkheads and cut them to the lengths corresponding to the belts. Mark each one so that you will remember where it goes. Then remove them from the model and place them diagonally between the lines on the drawing board in the same manner as the midship tape.

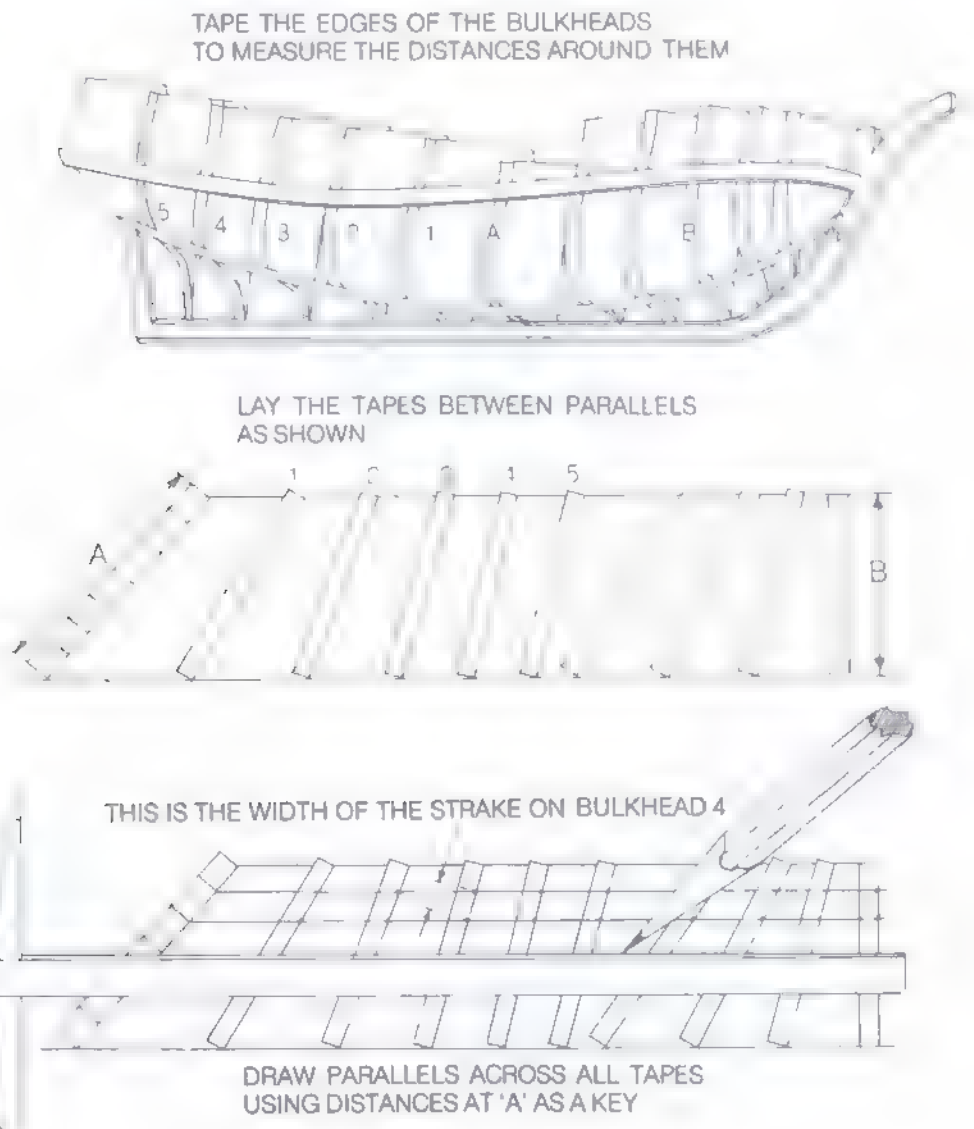
8) With the T-square strike parallel lines through all of the tapes using the distances marked off on the midship tape. The result will be a series of tapes of various lengths subdivided into the same number of equal parts, each part representing the correct width for the strakes at each bulkhead.

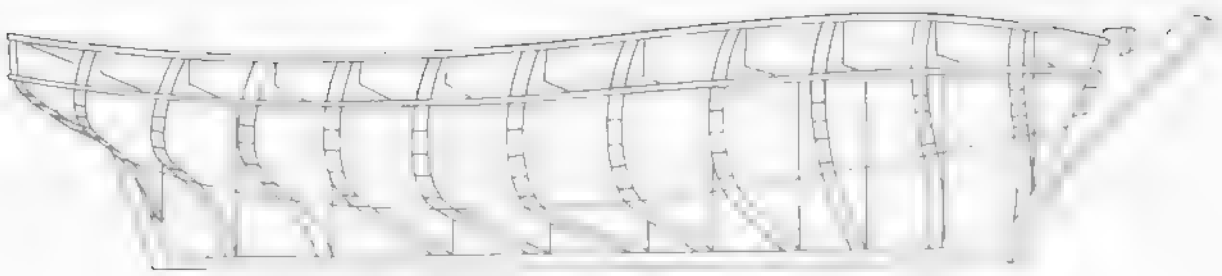
9) Replace the tapes on the face of the bulkheads.

10) Divide the height of the sternpost into equal parts corresponding to the number of strakes in the lower belt. Divide the width of the wing transom up to the wale by the number of strakes in the upper belt. Use tape where necessary.

The width of the strakes at the stem will follow from the tapers already established and may be plotted closely enough by eye.

The basic planking pattern has now been translated to the face of the bulkheads such that the face of each bulkhead has been subdivided into a similar number of equal parts. The pattern so assembled provides definitive specifications for most of the actual planks, but not for all of them. You will note that as the strakes approach the bow they become very narrow; in some cases tapering to outright points. You will also note that the width of strakes at the sternpost are wider even than those at midships. Both of these circumstances call for adjustments when translating the tape pattern into wood.





RETURN THE MARKED TAPES TO THE BULKHEADS AND THE PLANKING PATTERN IS READILY SEEN. WHEN SPILED THE UPPER BELT WILL LOOK SIMILAR TO THIS

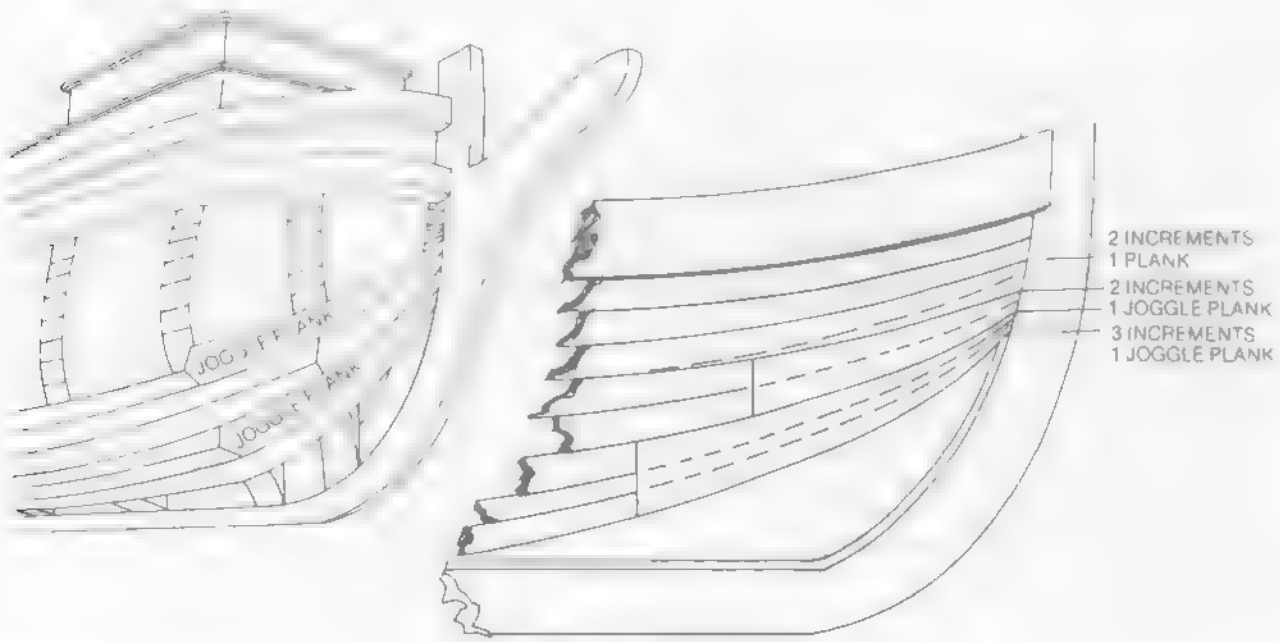
JOGGLE PLANKS AND STEALERS

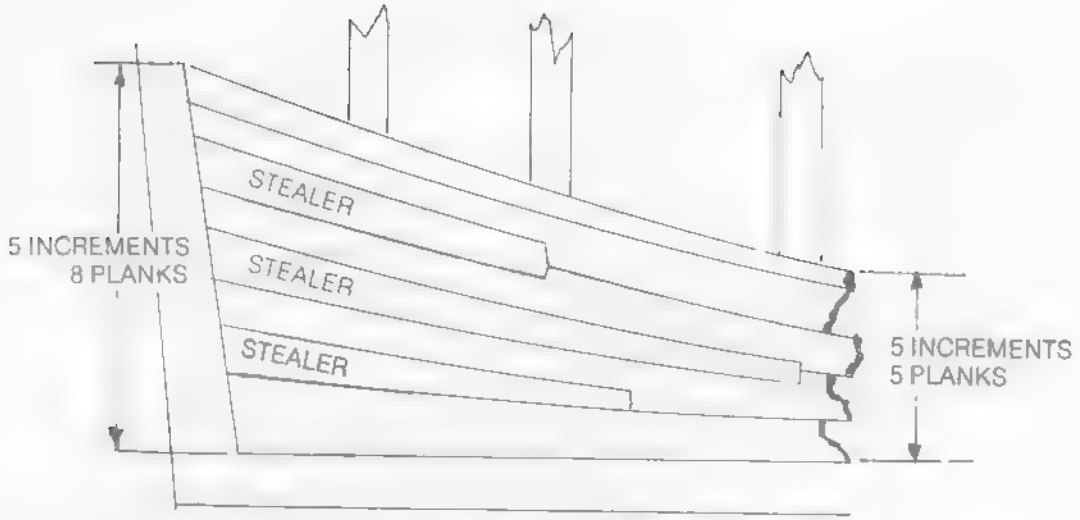
A cardinal rule in the planking of a ship was that no plank would taper to a point, since there was no practical way to fasten such a thin end. So as a pair of strakes tapered toward the bow to a width of four or five inches each they would end, and a single *joggle* plank would be fitted to match the flow of the two strakes up to the bow.

The strakes of bluff-bowed ships taper radically at the bow and may require three or four joggle planks for each planking belt. New hulls generally require fewer.

As the lower belt of strakes flow aft toward the sternpost following the natural spring of the planking material, as we observed in simple planking, they have a tendency to fan out. If the planks are force bent to the planking pattern, ugly curves result. So rather than force the planks to unnatural bends, they are allowed to fan out and the triangular gaps are filled with *stealers*. Stealer is the technical term for the triangular filler planks discussed earlier, but since real planks never ended in a point, the stealers were squared off and adjacent planks notched out (nibbled) to accommodate the shapes.

The tape planking pattern on the model therefore must be interpreted by the modeler to account for both joggle planks and stealers. He will decide, for example, that a pair of increments on the tapes shall represent two planks up to a certain bulkhead near the bow and thereafter a joggle plank. Similarly aft, he will decide that 2 or 3 increments on the sternpost tape shall represent the endings of perhaps 4 or 5 planks including the stealers.





STEALERS INCREASE THE NUMBER OF PLANKS ENDING ON THE STERNPOST OVER THE NUMBER OF SPILING INCREMENTS ASSIGNED TO IT. THUS 3 PLANKS WILL FIT 1½ OR 2 SPILING INCREMENTS.

BUTTS

The final step in working out the planking pattern is the determination of the butt joints. The general rule in the building of real ships was that butts on two adjacent strakes would occur on frames at least five feet apart. The butts of two strakes separated by a third would have to be at least four feet away. The butts of two strakes would never occur on the same frame unless there were at least three intervening strakes.

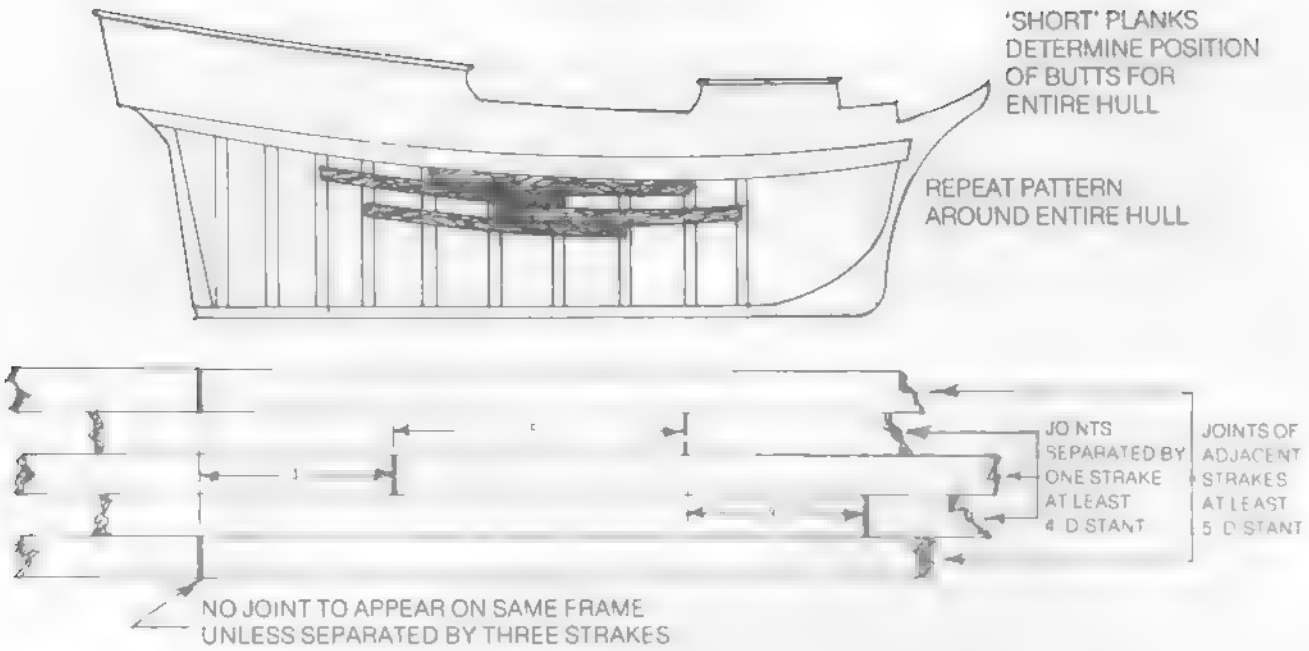
The modeler seeking to satisfy this requirement may be obliged to modify the frame structure of the model through the addition of extra bulkheads or filler pieces between the existing bulkheads. The idea is to provide positive support for all the plank endings rather than have them joined end to end in midair.

To determine the location of the butt joints on your model, determine the number of individual planks it will take to make up the longest strake. Each plank in scale will be about 24 to 30 feet long depending on the ship. So, if your ship is 100 feet with 24 foot planks, you will need at least five planks to make up a strake; four of them will run full length, the fifth will be a "short" plank. Each strake of the vessel therefore will include a plank called a "short" plank to which is assigned an arbitrary length equal to the distance between a pair of bulkheads around midships. The plank should span at least 5 bulkhead stations including the ending pair.

Assign positions for the "short" planks on the bulkheads nearest midships keeping the butts of adjacent strakes as far from one another as possible, as shown in the illustration. Build down a sequence of four strakes, starting at the wale or sheer, then repeat the same sequence for the balance of the strakes.

Once the butts of the "short" planks are established the rest of the butts in the planking follow by simply assuming that all other planks will be used full length or as close to it as the bulkheads allow.

It will readily be seen that what we have designated "short" planks will not, in fact, turn out to be the shortest planks in the hull. After extending full lengths fore and aft from those amidships, some of the final lengths at the stern and bow will turn out shorter than the so-called "short" planks. The last designate logical joints for the joggle planks and stealers.



SHAPING

Your model, when completely spiled, will have the tapes in place on the faces of all the bulkheads and marked for the widths and lengths of all the planks. The port and starboard patterns will match. The task now is the translation of the patterns into wood.

Begin at the sheer or wale with the "short" plank amidships. Cut a plank to length such that it runs center to center of the two bulkheads on which it is to end. Mark the center lines of the intervening bulkheads on it. Then cut the tapes on the bulkheads at the width marks. Remove the small bits of tape and place them on the plank as patterns defining the correct width for the plank at each bulkhead. Then with file, plane, or belt sander, hone the plank to shape. Be highly critical in shaping the plank exactly to the tape pattern.

Fit and glue the plank to the face of the bulkheads where you have removed the tape. Glue it also along the edge adjoining the strake above, similar to the procedure in simple planking.

Follow the same procedure for each plank, removing the bits of tape as you go and using them as patterns for the various shapes. Work the port and starboard sides alternately to maintain symmetry.

Individual planks will require varied amounts of bending as in simple planking. The majority around midships will require little while those at the bow and stern more. These bends should be worked into the plank before installation so that it may be glued in place with a minimum of springing.

The pre-forming of planks is more critical when laying them in short, scale lengths than when applying them in long, simple planking lengths. If short lengths are simply sprung onto the side of the hull, sharp corners will result at the butt joints and the planks will flow over the hull in jerky, flat jumps instead of in easy curves.

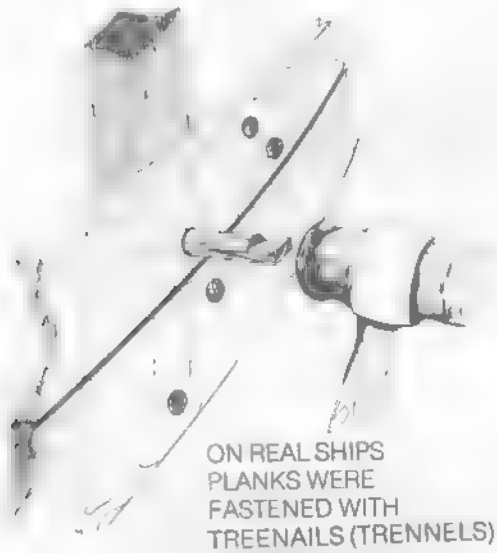
It is also critical in scale planking to pay extra attention to the edge bevels between adjacent planks since it is more difficult to rectify inexact joinery here than in simple planking.

FASTENINGS

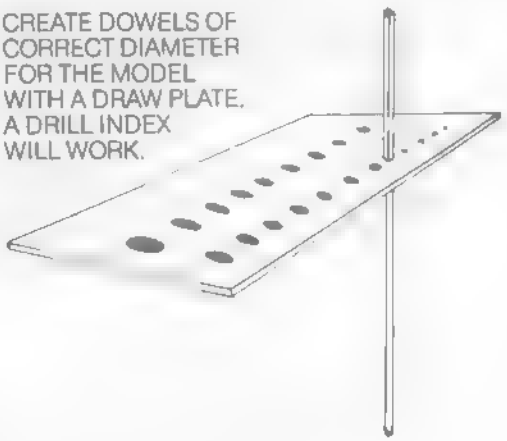
With all the planks neatly in place the modeler may wish to go on to the simulation of the trennels (or treenails) which would have been used to fasten the planks to the frames of the real ship. This task commits the modeler to the drilling of a great many small holes which he then fills up again with as many dowels. To do the job completely, he must mark out the positions of each of the ship's frames and then assign the positions of the trennels according to shipwright's practice.

Alternately the job may be stylized so that trennel fastenings only appear at the bulkheads or at the butts.

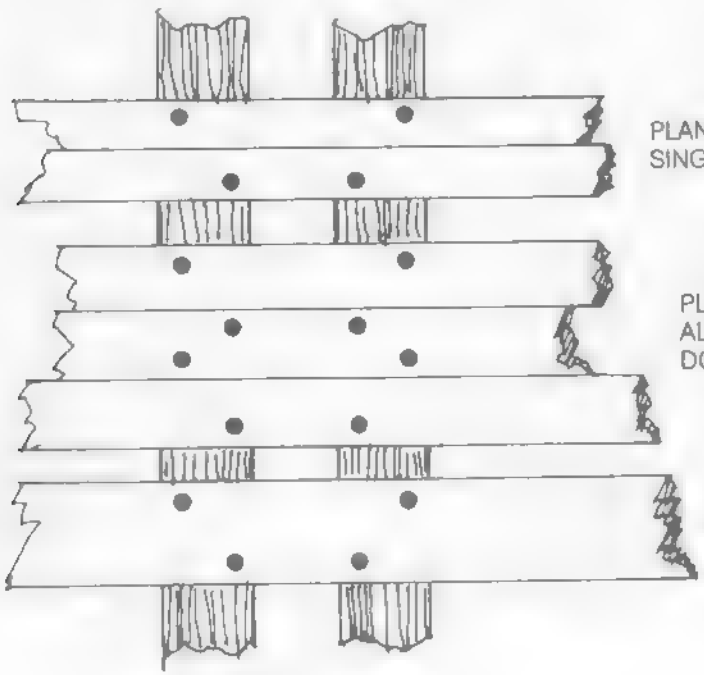
Small dowels may be obtained from ship model supply houses or can be made by drawing thin, square stock through a draw plate. A drill index can work for the latter. The dowel diameter in scale should be the equivalent of about 1" to 1½" in the actual ship. Also, since you want the heads of the trennels to show up, you should make them from a contrasting colored wood. Holly or boxwood work well for light trennels; pear or redgum will do for darker trennels.



ON REAL SHIPS PLANKS WERE FASTENED WITH TREENAILS (TRENNELS) OR DOWELS 1" TO 1½" DIAMETER



CREATE DOWELS OF CORRECT DIAMETER FOR THE MODEL WITH A DRAW PLATE. A DRILL INDEX WILL WORK.



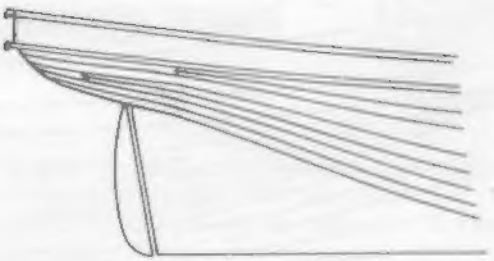
PLANKS 8" WIDE OR LESS SINGLE FASTENING

PLANKS 8" TO 11" WIDE ALTERNATE SINGLE AND DOUBLE FASTENING

PLANKS 11" WIDE OR MORE DOUBLE FASTENING

PLANKING THE STERN COUNTER

The upper belt of strakes on newer hulls continues aft of the sternpost to become the planks of the stern counter. On some ships these planks are closely parallel with the keel and so simply taper gently to their ends at the taffrail. On other ships the flow of strakes is less parallel such that some of them cross over the midline of the counter before reaching the taffrail. In this case the strakes are made to end herringbone fashion at the midline. Or alternatively, they are fitted to a nibbled, midline, king plank.



PLANKS FLOW TO TAFFRAIL

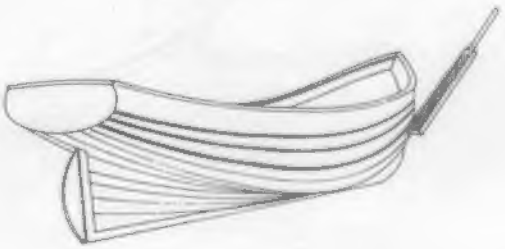
PLANKS END HERRINGBONE FASHION

PLANKS END AT CENTRAL NIBBLED KING PLANK

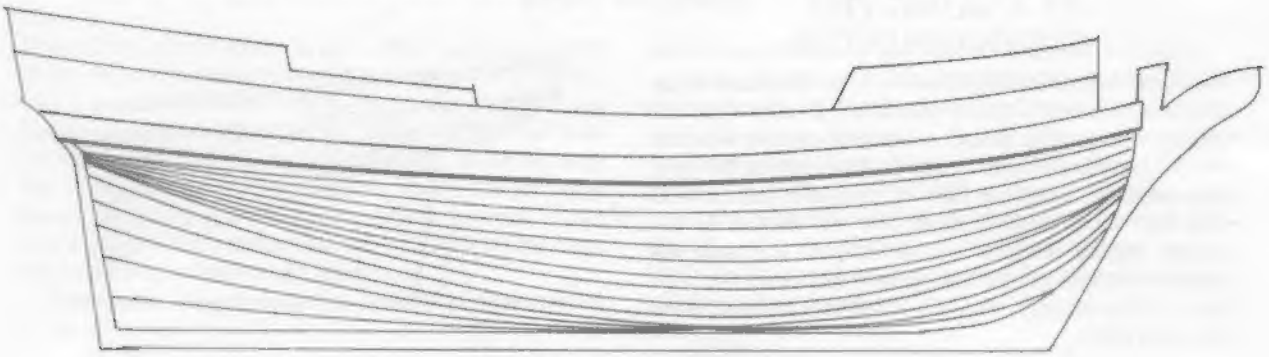
THE ENDS OF PLANKS ARE PROTECTED LIKE THIS

SEAMS

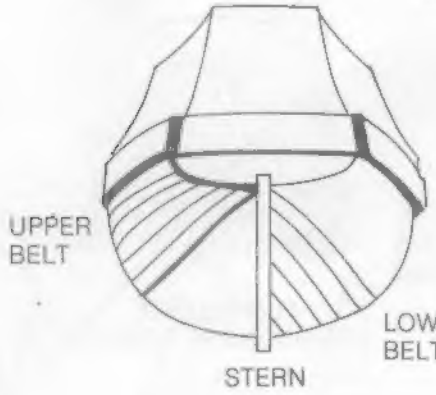
Precisely fitted model planks fit snugly together and unless the seams are properly defined you might just as well have stayed with a simple planking job. On real ships the outside edges of the planks were slightly bevelled leaving a groove into which caulking was hammered. This groove, filed into the seams of a model's planking, gives definition to the strakes and shows off the detail you have created.

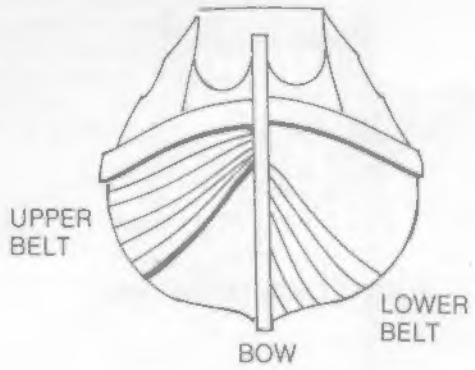


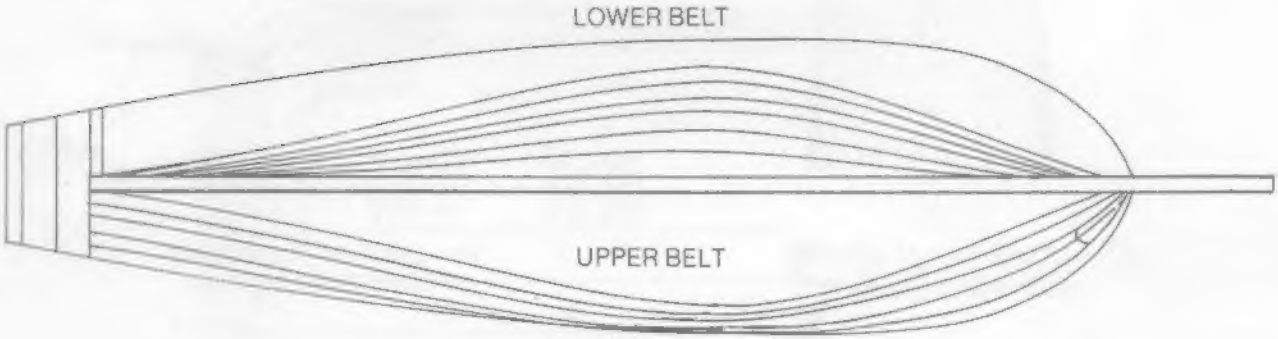
PLANKING OF BLUFF BOWED (OLD) SHIP



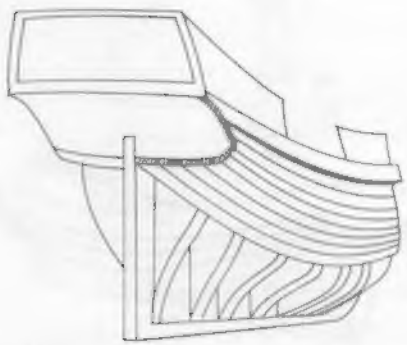
SIDE VIEW WITH BOTH
BELTS IN PLACE



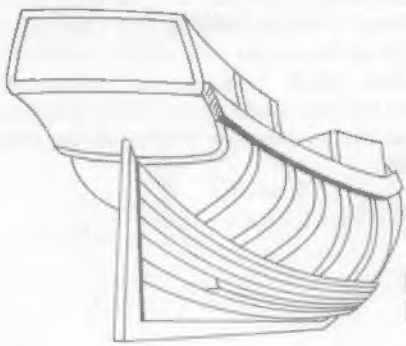




BOTTOM VIEW



UPPER BELT
IN PLACE



LOWER BELT
IN PLACE

A GLOSSARY OF PLANKING TERMS

ULISYS
18105031

APRON—Framing member at the bow for support of planks.
BEAKHEAD—vane-like extension of the bow or stem.
BEARDING LINE—the upper of the two lines that define the rabbet of the keel
BROAD STRAKE—2nd or 3rd strake out from the keel
BUTT—the joint between the ends of two planks
COUNTER—bottom portion of the stern aft of the sternpost
DEADWOOD—solid, built-up portion of the keel at the stern and bow
GARBOARD—strake adjacent to the keel
HOLLOW—reverse curves of frames at their intersections with the keel or deadwood
JOGGLE PLANK—a single plank extending the lines of two or more conventional planks
KING PLANK—a central plank with which a number of other planks join at various angles
NIBBLED PLANK—a plank notched to join with a number of other planks at various angles such as a "nibbled king plank"
PLANK—single planking member. Several planks end to end make up a strake
RABBET—groove in the keel, stem, and sternpost forming the joint with the planking
SHEER STRAKE—strake opposite the edge of the deck
SPILE, SPILING—plotting the shapes of a ship's timbers
STEALER—a filling piece used to widen the strake flow of two or more planks as at the stern
STEM—foremost framing member of the bow
STERNPOST—terminus of the bottom planking at the stern
STRAKE—a row or course of planks extending from bow to stern
TAFFRAIL—aftermost panel of the stern
TREENAIL (TRENNEL OR TRUNNEL)—wooden dowels used as fastenings of a ship's timbers
TURN OF BILGE—curve of transition between a ship's bottom and her side
WALE—extra thick strakes above the waterline of old ships
WATERLINE—the demarcation between the above and below water portions of a ship's hull
WING TRANSOM—a crossbar framing member at the top of the sternpost on which the side planks end

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